Do IMF Bailouts Result in Moral Hazard?

An Events-Study Approach

by Ilan Noy, Department of Economics, University of Hawaii at Manoa

Working Paper No. 04-2[1]

October 2003

Abstract

The IMF creates "moral hazard," when it provides bailouts to countries that face a BOP crisis. Two central questions are posed: is moral hazard observable in the data; and, if it is, what is its magnitude? We search for evidence that the unprecedented bailouts of the last decade have changed the investing environment in such a way that international investors started believing that their investments were insured. Our events-study is based on IMF-led events identified as both important and unexpected, such as the bailout loan for Mexico in 1995 and the absence of one for Russia in 1998. Our conclusion is negative: no such change in the moral hazard effect was observed. We demonstrate that events surrounding the out-of-sample Argentinean default (Dec. 2001) support our finding.

Corresponding Author: Ilan Noy, Department of Economics, University of Hawaii at Manoa, Honolulu, HI 96822 <noy@hawaii.edu>

[1] **This paper is a work in progress. For the latest version, please contact the author.**

1. On Moral Hazard in International Lending

The last decade has been a decade of spectacular currency, balance-of-payments and banking crises and equally spectacular and controversial bailouts. The problem of moral hazard in international crisis lending has consequently become very prominent in policy and academic discussions. A concern with moral hazard was one of the principal issues discussed in the Meltzer Commission's report on the International Financial Institutions (Meltzer, 2000).[1]

Evidently, criticism of the International Monetary Fund is widespread; the moral hazard issue is only one of several reasons why the IMF faces such hostility from professionals and the public and coming from different political persuasions. Moral hazard remains as the most prominent reason for criticism against the IMF from several prominent researchers and policymakers (e.g., Calomiris, 2000; Bordo and Schwartz, 2000; Meltzer, 2000; and Niskanen, 1999). Yet, in spite of numerous policy discussions on the topic, very little empirical work to date has been done on this issue.[2]

The current literature differentiates between moral hazard on the creditors' and on the debtors' sides. From the debtors' perspective, the implied or even explicit insurance/bailout enables domestic borrowers to increase their risk exposure beyond the optimal level in the absence of insurance, as, in case of a negative

[1] See Hutchison (2003) for a description of IMF programs and their size. The term 'bailout' is used here, as elsewhere in the literature, even though these support packages are subsidized loans that are almost always repaid on time. The magnitude of the subsidy is debatable since IMF loans face a different default risk than private or even other public lending as IMF loans are almost always paid back on time. For analysis of repayment experiences to the IMF, see Aylward and Thorne (1998).

[2] The only exceptions of which we are aware are Lane and Phillips (2000), Dell'Ariccia et al. (2002), Kamin (2002) and Dreher and Vaubel (2001). The last one only examines debtor moral hazard and is therefore not directly related to our work. The other three are surveyed in the next section.

shock that will leave them unable or unwilling to repay in full, they will be at least partially bailed out.

Our work focuses on the other side of a moral hazard in international bailouts – namely the creditors' moral hazard effect. As creditors are aware that they will be bailed out in case of a balance-of-payment crisis in an emerging economy, their behavior changes. This has often been cited as one of the more apparent stylized facts of the East Asian crises – especially since *ex post* most large international lenders were indeed partially bailed out.

An implied insurance (a bail-out is an *ex post* insurance policy) of sovereign and corporate bond issues or inter-bank lending can result in the following:

- An increase in the amount transacted over and above the amount that would have been transacted in the absence of such implicit guarantees.
- A decrease in the price of loans so that it no longer reflects the true (insurance-free) risk borne.
- A change in the composition of investment away from uninsured investment (e.g., equity) to insured flows (e.g., sovereign bonds).
- A change in the composition of international portfolios away from less risky but less profitable investment opportunities to more risky but more profitable if outcomes are positive.

These moral hazard effects might imply that IMF-led bailouts lead to sub-optimal equilibria in which there is both a dead-weight-loss and a redistribution of resources away from domestic or foreign taxpayers to the international creditors or the sovereign countries that are bailed out.

Supporters of these bailouts imply that these concerns are either misplaced, exaggerated or alternatively outweighed by other concerns (dynamic consistency issues, post crisis large output costs, etc.). In contrast, detractors of the IMF and the large bailouts it had orchestrated occasionally blame the very occurrence and severity of the recent crises on these moral hazard effects. For discussions of these issues see, for example: Dreher and Vaubel, 2001; Eichengreen, 2000; Jeanne, 1999; Jeanne and Zettelmeyer, 2001; Kho and Stulz, 1999; Kreuger, 2003; Lerrick and Meltzer, 2003; Mussa, 1999; and Rogoff, 1999 and 2002).

While there remains little doubt that moral hazard considerations are theoretically justifiable when international bailouts are concerned it remains to be determined whether these concerns have indeed a positive significance. We aim to contribute an answer to this question.

From a positive perspective, a theoretically tight argument for the presence of moral hazard as a result of international lending does not imply that the moral hazard effect is indeed of major import. It thus becomes apparent that the importance of the moral hazard effect should be treated as an *empirical* question.[3]

[3] The normative significance of moral hazard concerns is outside the scope of this paper. From a normative perspective, other factors that might outweigh these concerns in the decision whether to intervene can be the costs of refusing a bail-outs to the debtor country (output costs, distributional effects, etc.), costs to the creditors themselves in refusing to bail them out (as in the case of major U.S. banks in Mexico 1995) or possible spill-over and contagion effects from default (as in the publicly orchestrated private bailing out of LTCM). Also, exogenous constraints that might make moral hazard concerns irrelevant might be regulatory and institutional constraints on IMF intervention or international or domestic political-economy issues related to the demand or supply of bailouts. Furthermore, there is a clear trade-off between moral hazard concerns and other considerations so it might be the case that the socially optimal level of moral hazard is positive (i.e., in a second-best world, it might be optimal for a multilateral financial institution that maximizes world welfare to choose to create a moral hazard effect by supplying insurance). Some of the normative aspects of the moral hazard effect in international lending/bailouts are examined in Atkeson (1991), Corsetti et al. (2003), Döbeli (2002), Ghosal and Miller (2002), Noy (2003), and Powel and Arozamena (2003).

Here, we examine empirical evidence of a moral hazard effect as a result of large international post-crisis bailouts. The few papers that have dealt with this question empirically have found conflicting results. While Lane and Phillips (2000) and Kamin (2002) do not find much evidence of a significant moral hazard effect, Dell'Arricia et al. (2002) interpret similar data differently and conclude that there is a noticeable moral hazard effect in international debt markets. It is the intent of this paper to re-examine the data. We use a couple of different statistical methodologies and a different method for aggregating data than is used by any of the previous papers. Furthermore, we critically examine possible explanations, other than moral hazard, that might account for our empirical findings. Thirdly, we exploit newer data, most importantly surrounding the December 2001 Argentinean sovereign default to further our research agenda.

Critics of IMF bailouts cite the unprecedented scale of the Mexican bailout of 1995 as the watershed in moral-hazard-inducing bailouts. Accordingly, we should observe changes in international capital markets following that event and the introduction of even larger bailout programs in East Asia in 1997-8. In Figure 1, we present data on the volume of international capital flows in the 1990s. We indeed observe a very pronounced increase in capital flows up to and including 1997. But, when divided into its various components, almost all of this increase is attributed to a boom in foreign direct investment. Bond issues, flows that are most likely to 'enjoy' implicit insurance through those bailouts, do not show any marked trend over that time period. Bank lending, which also seems to be a (partially)

'insured' type of flow remarkably does show a trend that is consistent with a moral hazard story. In annual data, between 1995 and 1997 bank lending increased significantly. Then, it leveled of in 1998 and dropped precipitously in 1999. Thus, at least in the case of bond flows, we can conclude that an additional moral hazard effect created by the Mexican bailout did not manifest itself in increase in the volume of 'insured' flows.

Furthermore, by decomposing flows by regions, we observe that much of the volatility in bank lending is driven by local trends and does not represent a global phenomenon (see figure 2). Bank lending to East Asia started dropping already in 1997 and inflows turned to large outflows in 1998. In contrast, bank lending peaked dramatically in 1998 for Latin America but bank flows dried up completely in 1999. This contrast seems to contradict the standard moral hazard hypothesis that will imply similar changes in behavior of flows worldwide in reaction to perceived changes in the implied insurance offered by international multilateral institutions. Bond flows appear to be even more volatile and a moral hazard framework cannot exclusively explain trends there either (figure 3).

The absence of any evidence on the moral hazard effect on quantities leaves us with the possibility that moral hazard manifested itself in its effect on the *price* of insured flows, namely spreads. These spreads—the difference between the interest rate of foreign currency denominated bonds and a benchmark rate—are the focus of section 3.

Using a different methodology and different aggregated data than what has

been previously used in research on this topic, we contribute in a few distinct ways: First, by using a different methodology, we exploit higher-powered tests to examine the moral hazard hypothesis. Second, by looking in some detail at changes in market perceptions around the time of events we are able to interpret results differently. Third, by using data surrounding the IMF's decision to support and subsequently to abandon Argentina to default on its debt, we are able to shed additional light on the extent of moral hazard during the last decade. Fourth we also examine the quantities of capital flows, disaggregated by their type, to further our understanding of the possible effects of moral hazard.

Section 2 provides a literature review on previous theoretical research on IMF crisis interventions as well as on the empirical determinants of spreads and of all existing empirical research of which we are aware on moral hazard in international multilateral lending. Section 3 outlines the event-study methodology used, section 4 discusses the data and present stylized facts, section 5 presents our results, and section 6 concludes and outlines directions for future research.

2. Literature

Theory

A rapidly growing theoretical literature on currency crises deals with the moral hazard issue. Dooley (2000), in one of the earliest contributions, describes an insurance model and sees the implied insurance (partially financed by these rescue packages) as the driving force behind the outpouring of capital flows into emerging markets and the reversal of these flows that is occasioned by shifting

expectations as the defining moment of the crises themselves.[4]

More recent papers that incorporate moral hazard explicitly into an international macroeconomic model of lending are Aizenman and Turnovsky (2002), Corsetti et al. (2003), Dekle and Kletzer (2001), Döbeli (2002), Levy-Yeyati (1999), and Powel and Arozamena (2003).

Aizenman and Turnovsky (2002) includes both a lender moral hazard and a sovereign risk constraint. Their work examines the effects of reserve requirements on borrowing levels and introduces a welfare metric to evaluate various policies. Levy-Yeyati (1999) shows how a deposit insurance scheme in the lending country will lead to what he calls an 'over-lending syndrome' – a quantity rather than a price effect.[5]

Dekle and Kletzer's (2001) model explicitly introduces intermediation (banks) and includes a domestic lenders' moral hazard effect through a deposit insurance scheme. The paper demonstrates the mechanism that leads to a financial (banking) crisis. Corsetti et al. (2003) and Ghosal and Miller (2002) concentrate on the IMF's debtors' moral hazard. In contrast, Döbeli and Vanini (2002) argue, based on a game theoretic model, that creditors' moral hazard will lead to an increase in the quantity lent above the social optimum and should therefore be an important policy concern. A debtors' moral hazard, in contrast, will lead to the opposite effect in their model.

On the Empirics of Bond Spreads

[4] The insurance has to be accompanied by lax regulation that enables domestic borrowers (banks) to siphon off (maybe to off-shore centers) some of these borrowed monies.
[5] The name is used as a contrast with McKinnon and Pill's (1997) 'overborrowing syndrome'.

A number of empirical papers have looked at the determinants of emerging markets' spreads (of US$ denominated debt vs. some benchmark rate), but do not look specifically at the moral hazard question. Nevertheless, their methodology and findings provides us with a benchmark from which to develop a more complete identification of the determinants-of-spreads model parameters that we require for our empirical exercise.

Several papers investigate empirical models and identify variables that determine country specific bond spreads. Some identify various aggregate and country-specific economic variables that effect spreads thorough their influence on perceived (or actual) risk (e.g., Min, 1998). Others use credit risk indices as a proxy for the perceived risk in a sovereign borrower and examine only those indices and additional bond-specific variables as the determinants of spreads (e.g., Larraín et al., 1997; and Cline and Barnes, 1997). Eichengreen and Mody (2000), in the model closest to ours, use both macroeconomic variables and the orthogonal component of publicly available credit ratings as determining spreads.

Another strand in this literature identifies various global indicators that might affect global demand or supply of emerging market bonds and thus effect their price (spread). Kamin and von Kleist (1999) and Min (1998), for example, find that industrial country interest rates that theoretically should affect the aggregate demand for emerging market bonds and the implied creditworthiness of borrowers are insignificant in their regressions. Cline and Barnes (1997) suggest that the increasing global supply of capital available to emerging markets is part of the reason for the sustained decrease in spreads between mid 1995 (following the

Mexican crisis) and October 1997 (the Asian crisis). As they point out, in order for this argument to be valid the increase in supply cannot be matched by an increasing demand for capital by emerging markets borrowers for spreads to decrease. Without these demand and supply effects, we assume that spreads should only reflect perceived default risks.

The implied assumption is, of course, that while spreads are determined by the perceived level of risk associated with each bond these are in turn determined by whatever variables are observable to market participants (buyers and sellers) at the time of issue or of trade (for secondary market spreads). In our work, we investigate the resulting estimation errors, which we cannot attribute to these observable fundamentals. We attempt to associate these errors with a moral hazard effect.

Mauro et al. (2002) find that during the 1990s spreads were co-moving more than in the previous 'global' era (1870-1913) and that these co-movements tend to be mostly related to global events and not to country specific ones; their interpretation is that investors today pay less attention to country specific information but a moral hazard interpretation can be applied as well.

Eichengreen and Mody (2000) try to explain the continuous drop in spreads following the Mexican crisis all the way up to the summer of 1997.[6] They suggest two different explanations: the first is that markets are perfectly efficient and frictionless and the decline in spreads is a result of a decline in expected default risk. From the early 1990s many developing countries attempted to put their

[6] While this observation is generally accurate, Eichengreen and Mody (2000), for example, observe that following the Mexican crisis Latin American spreads actually rose while East Asian ones continued to decline.

monetary and fiscal affairs in order – more so as the apparent costs of the Mexican crisis came into light. The other explanation, which they seem to support, points to more liberal financial market conditions in lending countries and a possible arbitrary shift in pricing behavior (an irrational exuberance) on the part of international lenders; both leading to decreasing spreads. Their result seems to tie in with the Mauro et al. (2000) argument that investors, at least up to August 1998, seem to be paying less attention to country specific information.

Eichengreen and Mody (2000) stress that their model of the effect of fundamentals on the demand and supply of bonds and consequently on their spreads gives only a very partial explanation for spreads. They interpret this large residual as market sentiment. We attempt to test whether the residual we obtain is actually related to a moral hazard explanation – the likelihood that these bonds are completely or partially insured. Interestingly, they find that the residual is especially large for the period following the Tequila-Mexican crisis of 1994-1995. This seems consistent with popular commentary that the large Mexican bailout package created a moral hazard effect as it increased the implied insurance available for sovereign debt.

While the papers mentioned in the previous section occasionally presented findings that appear to us to be consistent with a moral hazard interpretation, only three papers of which we are aware attempted to investigate directly the presence and the magnitude of a bailout induced, IMF-moral-hazard effect. The three are described in detail in the next three subsections.

Lane and Phillips (2000)

Lane and Phillips (2000) is, to our knowledge, the first paper that attempts to look directly at the magnitude of the moral hazard that results from IMF financing (bailouts). As they interpret it, their preliminary work suggests that even if there is an IMF moral hazard effect, its magnitude is not very significant. They find that spreads do not change much in response to changes in perception of the IMF willingness to provide bailouts. They base their finds on an examination of secondary market spreads for dollar denominated bonds following a series of events they identify as affecting the perception of international investors on available financing for bail-outs.

In almost all the events they identify they do not discern any significant change in the time series of spreads (defined as a change of more than one standard deviation). Lane and Phillips (2000) argue that as IMF financing is small (as ratio to GDP or to external debt stock), and since financing from other sources is limited as well, it is not clear to investors whether they will not be too far back in the queue. The perceived bailout probabilities (a moral hazard effect) will thus only be indirectly incorporated into the perceived default risk if a possible bailout affects the probability of default *ex ante*. Notably, Lane and Phillips (2000) do find a significant movement of spreads following the Russian default (and the glaring absence of an IMF bail-out in that case).

Dell'Ariccia, Schnabel and Zettelmeyer (2002)

In contrast with Lane and Phillips (2000), Dell'Ariccia et al. (2000) focus on a single event, the Russian default of August 1998, but use a more detailed empirical model to test their hypotheses.

They gather a balanced panel data-set for secondary market spreads and argue that any event that increases the perceived probability of a bailout should affect the model's estimated coefficients in three distinct ways. First, the coefficient on the event date dummy should be negative and significant. Second, the slopes of the coefficients on other variables should decrease, as investors pay less attention to fundamentals in forming their expectations of default probabilities. Third, the dispersion of spreads across countries should also decrease, as investors pay less attention to differences in macroeconomic fundamentals across countries when determining their credit-worthiness.

Their empirical model is based on a standard bond-spread determination model as described in the previous section. They interpret their evidence on the Russian default as showing that a significant moral hazard effect existed prior to the default (i.e., there was a perceptible shift in market sentiments as regarding the likelihood of future defaults).

As Lane and Phillips (2000) only look at the statistical properties of the spreads' series, Dell'Arricia et al.'s (2002) modeling technique can be seen as more convincing. Dell'Ariccia et al. (2002) note that in order for their testing strategy to be valid the event they identify (the Russian default) has to satisfy three conditions: (1) It has to change investors' perceptions on the likelihood or the extent of future bailouts; (2) It has to be unexpected; and (3) It must not lead

to a reassessment of risks other than through the expectations of future international rescues. Whether the third condition holds for the Russian case appears debatable, although Dell'Ariccia et al. (2002) plausibly claim that the Asian crisis of the previous year should have been sufficient to 'wake up' investors to the dangers of lending to emerging markets so that the Russian default did not contain any new information besides the absence of a bailout. Additionally, they note that the unraveling of the Russian stabilization program and the consequent default, a classic fiscal crisis in a fairly small economy that is not tightly connected to the rest of the world, would not have contained any information relevant to other emerging markets.

Nevertheless, Dell'Ariccia et al. (2002) do not note that their estimation strategy, and specifically their usage of infrequent data (quarterly) and large window (three quarters) also assumes that the Russian crisis was the only event that effected bond spreads systematically between August 1998 and March 1999. Their work therefore crucially rests on the assumption that the only event that might have affected their dependent variable (spreads) in that 9-month period was indeed the Russian default. This does not seem to be the case. In the weeks following the Russian default two important and unexpected events occurred: the Long-Term-Capital-Management (LTCM) crisis which was partially resolved once the New-York Fed orchestrated a private sector bailout of the hedge fund, and a dramatic revision downward in expectations for the world economy for 1999. Another IMF working paper that examined both the Russian Crisis and the LTCM one concluded that the LTCM crisis was a very large liquidity shock that

affected most countries' spreads more than the Russian default (Dungey et al., 2002). Thus, the effects that Dell'Ariccia et al. (2002) find on spreads, and which they interpret as a weakening of the pre-Russian-default moral hazard, can equally be interpreted as caused by the massive decrease in liquidity as a result of the LTCM crisis.[7] We discuss this point further in section 5.3.

In contrast with Dell'Ariccia et al. (2002), our paper employs monthly data, financial event study methodology, a different regression technique, and identifies more events. These present a more robust estimation methodology and our results do seem to be different.

Kamin (2002)

Kamin (2002) concludes that price (spread) data does not seem to indicate a significant moral hazard effect. He then goes on to evaluate two other possibilities: (1) that the moral hazard effect manifested itself in increases in quantities of capital flows rather than in decreases in prices; and (2) the moral hazard effect should be observed, if it exists, more strongly in systemic countries—countries that will not be allowed to default by the multilateral institutions because of their geo-political or economic importance.

For the first hypothesis, Kamin (2002) finds little evidence of an increase in capital flows as a result of the apparent change in IMF policy after Mexico, 1995. Interestingly, his paper does not distinguish between different types of capital flows. One would expect to see an increase as a result of a moral hazard effect for those types of flows that are more likely to be indeed bailed out. As we

[7] Dell'Ariccia et al. (2002) do note that "…results should be interpreted as confirming a necessary,

demonstrated in the previous section, even after differentiating between different flows one cannot observe support for a strong moral hazard hypothesis. For Kamin's (2002) second hypothesis—that one would observe a stronger moral hazard effect for systemic countries—the results are similar. Once one distinguishes, in an admittedly ad hoc manner, between different types of countries (in terms of their systemic importance) one cannot observe any meaningful difference in either their spreads or the volume of capital flows they receive.

3. Event-Study Methodology

Financial event-study methodology is outlined in Campbell, Lo and MacKinlay (1997). By regressing a panel data set that contains standard spread determination variables we obtain estimated coefficients for our variables. We then use those estimated coefficients to construct estimated 'abnormal' spreads around event months and examine their statistical properties.

We use the Lane and Phillips (2000) identification of events and group them into four major moral hazard inducing events:

- 1/1995 : The Mexican Program
- 8-12/97: Thai, Indonesian and Korean Program + IMF Board's approval of new Structural Reserve Facility and suggestion of quota increase
- 10-12/98: U.S. Congress ratifies quota increase + IMF approval of a large program (600% of quota) for Brazil
- 3/2000: Large Argentinean Stand-By approved

---

but not sufficient condition for the presence of moral hazard." (p. 7).

We exclude a four month window after each event and therefore estimate our 'normal' model on the following periods: 1-11/1994, 6/1995-6/1997, 5-6/1998, 5/1999-1/2000, 6-12/2000.

We take the probability of a balance-of-payments crisis to be a function of the country and time-specific macroeconomic characteristics (X_{it}) and the external environment (X^W). The probability of being repaid if a crisis occurred is assumed to be a function of the amount of resources available for repayment (reserves, and existing credit lines—X^{RES}) and the likelihood of IMF bailouts (p^{IMF}). Initially, and following the previous literature, we assume a linear structure for the spread determination model:

$$s_{it} = \beta_i + X_{it}\beta_1 + X_t^W\beta_2 + X_{it}^{RES}\beta_3 + u^{IMF} \qquad (1)$$

Where u_{it}^{IMF} is an error term that should also reflect p^{IMF}. We estimate this model for all the estimation window observations (T_{-1}×I×N observations).[8] We use the estimated coefficients from this sample to find the parameters of a 'normal spreads' model – i.e., equation (1).[9]

We then construct

$$\hat{u}_{it}^{IMF} = s_{it} - X'\hat{\beta} \qquad (2)$$

for all the event window data (T_0×I×N observations). We examine the properties of the error term $\hat{u}_{it}^{IMF}$ around the event months.[10] By assuming that our normal

[8] I is the number of countries and N the number of events. T_{-1} is the estimations window, T_0 is the event window, and T_1 is the post event window.

[9] This procedure insures that our estimates are not biased because of the changes following these events.

[10] This methodology prevents at least one of the problems noted by Dell'Ariccia et al. (2002) in their work; namely that a change in IMF policy that might change the magnitude of the moral hazard effect can be expected to change the relationship between other macro variables and the spread level (our LHS variable).

spreads determination model is fully specified we derive conclusions on the probability of payment variable by looking at the statistical qualities of the estimated 'abnormal' spread around the events days. We repeat this procedure for the Russian moral-hazard-reducing default event of August 1998.

A Durbin-Watson statistic for all iterations of the model strongly indicates that the error terms are autocorrelated.[11] We therefore estimate the model using the Prais-Winsten algorithm. The Prais-Winsten procedure is a two-step FGLS procedure that utilizes the estimated correlation coefficient obtained from the Durbin-Watson statistic from the first-stage OLS regression as the initial autocorrelation value and reiterates the second step FGLS using the whole sample till convergence (typically 2-3 iterations).[12]

4. Data

Two data sets on spreads have been previously used:

- Indices of emerging market spreads for secondary-market sovereign bonds (US$ denominated) over US treasury bills (both average index - the EMBI+ - and for 15 individual countries accounting for most foreign currency sovereign lending). The index is available from *JP Morgan*.
- Data on issues of individual bonds (both commercial and sovereign) from the '*bondware'* database.

Selectivity bias is a problem with the 'bondware' data as the decision whether to issue debt is endogenous and dependent on the same variables that supposedly affect spreads. Launch spreads are therefore difficult to interpret as an increase in

[11] Durbin-Watson statistic is less than 0.5 and the estimated ρ is 0.8.

perceived risk can actually cause a decrease in spreads as only the most credit-worthy issuers stay in the market while riskier borrowers withdraw. A procedure to overcome this bias is available – Heckman's (1979) two step procedure; but, its efficacy depends on specifying an accurate model for the launch decision and involves proxying for bonds that are not launched (Blundell and Costa-Días, 2000). Dell'Ariccia et al. (2002) use this data with the Heckman (1979) procedure and obtain insignificant results for the selection bias.[13] We do not use the *Bondware* data.[14]

The JP Morgan data, the EMBI, is more uniform across time and between countries and is thus convenient and appropriate for our needs. The countries included in the EMBI data set are: Argentina, Brazil, Bulgaria, Colombia, Ecuador, Korea, Mexico, Morocco, Panama, Peru, Philippines, Poland, Russia, Turkey, and Venezuela.

As daily data is volatile, we prefer to use an average of daily rates. Dell'Ariccia et al. (2002) use quarterly averages and examine post-event data using a 3-quarter window to prevent the volatility that resulted from the 1998 Russian default from affecting their results. While there might have been other considerations for their choice, it does seem as though monthly data – which we use – will smooth the data sufficiently so that valid conclusions can be had.[15]

---

[12] For technical details see Greene (2000, pp. 546-550) and Greene (2002, E7 pp. 4-7).
[13] As we note in Hutchison and Noy (forthcoming) this can be because there is no selection bias or, as seems more likely in this case, because the launch model is inaccurately specified.
[14] Kamin and von Kleist (1999) note that launch spreads are a better measure for borrowing costs and will therefore be more appropriate if any conclusions on real costs of the moral hazard effect are sought. The question of the real costs of a moral hazard effect is not within the scope of this paper. To our knowledge, this question has never been looked at.
[15] There is a tradeoff here. Using daily data will significantly increase the power of tests that use event-study methodology. Our problem is both that none of the data we use for our spread determination model is readily available on a daily or weekly frequency (or if it is it does not

An examination of the JP Morgan data series we use in our estimations (1994-2000) reveals some interesting observations. A graph of all the monthly country-series reveals that spreads peaked first during the beginning of 1995 (the Mexican crisis), and were then followed by a continuous and gradual decline of spreads for almost all countries up to October 1997 (figure 4). The Asian crisis was followed by only a small increase in spreads (relative to the Tequila crisis) and by the second quarter of 1998 spreads have gone back to their pre-crisis levels. The rise in spreads was much larger and across-the-board during mid 1998 and the Russian default. Increases were especially high for Ecuador, Russia and Venezuela but all other countries (excluding Poland) experienced large increases comparable to the ones in 1995. This period was again followed by a period of decline but even at the end of 2000 spreads were still, in general, higher and more dispersed than their lowest levels of mid 1997.

A look at the EMBI+ index (daily rates) in figure 5 reveals a similar story. There was a significant increase in December 1994, when the Mexican crisis became apparent and the peso was devalued but the highest peak during the whole time period shown (1994-2000) was in March 1995 in the aftermath of the Mexican crisis. Other peaks can be observed in June 1995, November 1995 and March 1996. The index then declined continuously until it started peaking again when the Asian crisis started to enfold. A local peak was reached in November 1997 but increases then were much more moderate than the ones in 1995. The EMBI+ index increased rapidly again immediately preceding Russia's default on

---

change much) and that the event timing is not entirely clear. We are not sure when did markets become aware of the impending event – be it a bailout or an absence of one. See Morse (1984) for

its domestic debt on August, 17th, 1998. Another index, excluding Russia and Ecuador shows that spread levels only returned their pre-Russian-crisis levels at the beginning of 2000 and did not decrease back to their lowest levels even by the end of the year.

Even at this stage, it is clear why research that focused on the Russian default might find moral hazard while papers that examined the previous period could not discern such evidence. We examine the Russian default separately in section 5.3.

Some of the macroeconomic data we use in our spread-determination model are not available monthly (although inflation rates, for example, are available in monthly frequencies for the whole sample). Still, the model assumes the affect of macroeconomic data on spreads through its affect on expected default probabilities (through the information set available to investors). Thus, using quarterly data in a monthly panel for some of the variables does not pose a conceptual problem. We require the variables observed by international investors when they determine the likelihood of default and if these are available only in quarterly frequency they should be sufficient - provided attention is paid to when variables become public knowledge.

Our baseline model includes variables that measure the liquidity of the country and its ability to repay in the short run (debt to GDP, net foreign assets, reserves to GDP and current account flows to exports), and other macroeconomic variables commonly used to assess creditworthiness (inflation rate, high inflation dummy, fiscal deficit to GDP and export growth). To proxy for institutional and political

discussion of using daily vs. weekly or monthly data, and Lee and Varela (1997) for event day

variables that are used by investors in assessing risk we use Standard & Poor's sovereign credit ratings. As these ratings are correlated with the other macroeconomic variables we use, and in order to prevent bias in our estimates, we use only the orthogonal component of the credit rating variable.[16] We also use two variables to proxy for the world economic conditions as these affect emerging markets (US Federal Funds rate and developing countries exports' price index). For data sources and for details on our use of the S&P's credit ratings see appendices A and B, respectively.

5 Results

5.1 Moral Hazard Inducing Events

We begin by assuming that market participants possess perfect foresight (i.e., $E_{t-1}X_t = X_t$). We regress our panel for the pre-events periods (estimation window) without lagging any of the explanatory variables. Results are given in Table 1 column (1).

While most coefficients have plausible signs only several are significant. But, importantly for our model, the adjusted R^2 from this regression is high (0.64). The relatively high explanatory power will therefore enable us to better identify the abnormal returns in the event-window data.

Using these results we obtain abnormal returns as specified in equation (2). We examine the abnormal returns computed for the periods of interest:

- 2-5/95- following Mexico

---

uncertainty.

[16] For a recent discussion on credit ratings and default probabilities see Reinhart (2002).

- 1-4/98- following East Asia
- 1-4/99- following Brazil
- 2-5/00- following Argentina

In the perfect foresight case no evidence of moral hazard is present. In almost all cases the averages of the abnormal returns across countries, and by periods, are negative. A presence of a significant moral hazard effect should have resulted in positive abnormal returns (as the estimated spreads should have been higher than actual spreads). Results are reported in table 2. These conclusions do not change if we exclude the crisis countries (Mexico, Korea, Philippines, Russia, Brazil and Argentina) during their respective crises (table 3). Notably, outliers do not drive these findings. Almost all, and in some cases virtually all, abnormal returns are negative.

Separately, we compute abnormal returns without relying on the previously used perfect information assumption. We regress our baseline model with lagged variables (assuming $E_{t-1}X_t = X_{t-1}$).[17] Results are reported in table 1 column (2). The predictive power of our equation stays similar and we construct abnormal returns using eq. (2). Once more, the averages of the abnormal returns across countries, and by periods, are negative and a presence of a significant moral hazard effect is not detected (table 4).

By assuming normal distribution of the error term under the null hypothesis of no moral hazard we can use simple t-statistics to identify 'abnormal' – i.e., moral hazard – effects. In none of the results reported can the null of no moral hazard be

rejected. For a non-parametric (distribution free) test, we use the sign test (as in MacKinlay et al., 1997) but arrive at the same conclusions; no rejection of the 'no moral hazard' null. This is not to say that no moral hazard effect exists. Based on these findings, we can conclude that the large bailouts of the 1990s either did not create an additional effect or alternatively the additional moral hazard effect it created is hidden behind repeatedly worsening worldwide outlook. We find this second possibility hard to believe for much of the time period we examined.

5.2 Daily Data

In an attempt to better identify the effects of specific events, we pursue the same exercise but with daily data. The only variables that are available on a daily basis are the interest rates and the S&P credit rating variables. Yet, these are not sufficient to estimate a powerful enough 'normal' model and enable a more detailed look on the evolution of 'abnormal returns' around moral-hazard-inducing events. Even though the adjusted R^2 is 0.40, the inclusion of the S&P ratings and interest rates does not contribute much to the explanatory power of the model beyond the country-specific fixed effects.[18]

As a first pass, it is worth noting that while spreads started increasing for Russia almost a week before it defaulted, other countries spreads mostly started increasing rapidly on August 20th, after the default was announced. It is still necessary, though, to attempt to distinguish between the effect of the perceived

[17] We assessed the frequency with which variables are published and lagged most variables 3 months (1 quarter) while, for example, lagging the inflation variables only one month. We experimented with other lags but results were very similar.
[18] An F-test cannot reject the null that these variables are jointly insignificant.

'bad news' on the world economy and the 'moral hazard' effect of the default - an exercise we discuss in the next section.

5.3 The Russian Default (August, 1998)

Not surprisingly, the evidence on the Russian default is different. As we have already observed, spreads clearly increased substantially following the Russian default. Our procedure shows that these increases were significantly larger than what actual changes in the macroeconomic variables we controlled for predicted. Averages of abnormal returns following the Russian default are large, negative, and highly significantly different from zero (table 5). This, of course, can be interpreted as evidence that the Russian default occasioned investors to reduce their expectations of future bailouts and reduced the moral hazard effect.

Many observers of the Russian crisis seem to agree that a moral hazard effect was indeed a major driving force in directing large amounts of capital into the Russian debt market prior to the crisis. Russia was taken to be the model case of the 'too large to fail' doctrine (or the 'too nuclear to fail doctrine').[19] What is more interesting is that when the international multilateral organizations failed to intervene in August 1998 and Russia defaulted on its domestic bonds, other countries spreads increased substantially as well. It seems that international investors did take the absence of intervention to mean that the IMF might no

[19] For a detailed chronology of the fiscal crisis that led to the Russian default and its aftermath, see Kharas et al. (2001). Kharas et al. (2001) assert "Portfolio investors might have been anticipating a large bailout that would at least postpone a crisis and keep their one-way bet for a few more lucrative months" (p. 42). They quote market commentary from the same time to support their claim.

longer be willing to intervene during other countries' crises, as well. This is Dell'Arricia et al.'s (2000) interpretation.

Yet, the increase in spreads can also be accounted for by a major revision of expectations on the part of investors. While Dell'Arricia et al. discount this possibility, the IMF reported, in its *World Economic Outlook* of October 1998:

> International economic and financial conditions have deteriorated considerably in recent months as recessions have deepened in many Asian emerging market economies and Japan, and as Russia's financial crisis has raised the specter of default. Negative spillovers have been felt in **world stock markets**, emerging market interest spreads, acute pressures on several currencies, and further drops in already weak commodity prices….**World growth of only 2 percent is now projected for 1998, a full percentage point less than expected in the May 1998 *World Economic Outlook* and well below trend growth. Chances of any significant improvement in 1999 have also diminished, and the risks of a deeper, wider, and more prolonged downturn have escalated.**

Williamson (2001) uses even stronger language: "The weeks following the collapse of the Russian program marked the apogee of the most dangerous economic crisis that the world has seen in recent decades." (p. 60).

In our empirical work detailed in the two previous subsections, we controlled for credit ratings in attempt to control for the macro-economic outlook but these ratings are notoriously sluggish and are typically revised downward only *ex-post* (see Reinhart, 2002). Our inability to control for emerging markets' economic outlook might be the reason behind our findings for the Russian case.[20] We discuss this issue further in the next section.

[20] This does not preclude the possibility that the reason why there was a worsening outlook for the world economy was exactly the presumption that large multilateral bailouts will no longer be forthcoming. This possibility, on the one hand, reinstates the moral hazard hypothesis, but, on the other hand, it suggests a powerful incentive for the multilateral lending institutions to continue maintaining a moral hazard effect through bailout guarantees. One can doubt this interpretation as the LTCM bailout followed the Russian default (Sep. 1998), as did a decision by the U.S. congress

5.4 The Argentinean Default (December, 2001)

The recent dramatic events in Argentina are, from this paper's perspective, immensely interesting. As we detailed in the previous section, any conclusions obtained from the Russian non-bailout case are fragile, as we cannot differentiate between the effect of the non-bailout event for Russia, the LTCM crisis, and the general worsening outlook for the world economy. The events surrounding the Argentinean default represent a Russia-like absence of international bailout but in the absence of any other major financial crisis or much worsening world economic outlook (both of which were concurrent with the Russian case). Thus, the events surrounding the Argentine crisis offer us a perfect test case for the validity of the moral hazard argument. While Argentina does not appear to fit, as does Russia the 'too nuclear to fail' argument, the international bilateral financial institutions were heavily invested in the success of the Argentinean economy both because it was looked upon as very important to the region (to MERCOSUR and more broadly, Latin America), and specifically as a major test-case—or a poster child—for the new liberalization program, the 'Washington Consensus' policies advocated by the IMF throughout the 1990s.[21] Thus, one could reasonably expect the IMF to bail out Argentina in case such an action was deemed to have a positive likelihood of succeeding. We briefly detail the events in Argentina and then go on to examine the evidence. Our description of events is based on Powell (2003).

---

to increase IMF quotas (Oct. 1998). Both of these should have alloyed fears that bailouts will no longer be forthcoming.

[21] For such an argument, see Pastor and Wise (2001).

There is an almost universal agreement that the roots of the Argentinean crisis were in mismanaged fiscal policy going back to the end of the 1990s. But, even in the first quarter of 2001, the government's fiscal position did not appear to require more than a relatively mild adjustment (economically, but not, as it turned out, politically). Argentina's problems started to compound as a result of the Russian crisis, the Brazilian recession, falls in commodity prices (especially agricultural exports) and the Brazilian devaluation in January 1999. In October 1999, and after much political infighting inside the ruling Peronist Party (under the then President Menem), a new president from the opposition Radical Party was elected (De la Ruá). In it's first year in office, the De la Ruá government implemented a tax increase in an attempt to improve the government's fiscal position. The ensuing recession led both to political turmoil (and growing opposition to the tax increases) and to a worsening of the interest burden the government had to pay on much of its debt (most of it short-term); the two reinforced each other. By the end of 2000, the government negotiated a support package from the IMF and other multilateral institutions (totaling approximately $30bn). After replacing the economy minister, the government announced a plan of major cuts in public expenditures, but this program was derailed and resulted in another change in the economy ministry (now to be headed by the original architect of the Argentinean Convertibility Plan – Domingo Cavallo).

After several attempts at heterodox economic policies in an attempt to calm international investors and prevent a bank run, and after the sacking of the Central Bank's president by the Senate, the situation did not improve. A mega-swap of

debt was then initiated leading to a lengthening of maturities at the price of higher interest rates (The Russian government attempted a similar swap that was designed to change the maturity and currency structure of its debt in July, 1998).

On June 15th, Cavallo announced a complicated system of subsidies and tariffs that amounted to a 'dual exchange rate regime.' Since this was in clear contravention of previous IMF advice it was widely expected that the IMF would withdraw.[22] Several weeks of financial turmoil ensued but an agreement with the IMF was reached on August 21st. The new agreement provided additional financing ($5bn), beyond the amounts agreed to a year and a half earlier.[23] This program appeared to be a strong indication of the IMF's willingness and commitment to aid Argentina in its fiscal adjustment; and by extension, of its continued commitment to providing multilateral bailouts in spite of strong objections from the U.S. Secretary of the Treasury.[24]

The Argentinean authorities started publicly discussing an orderly (read: not voluntary) debt restructuring in November; a bank run ensued and the authorities imposed strict capital controls and restrictions on deposit withdrawals (known as the 'corralito'). On December 5th the IMF refused to provide a $1.3bn loan installment and after another failed attempt to reach an agreement (on December 17th) the political situation quickly deteriorated, De la Ruá's government was swept from office by massive street protests and Argentina defaulted on its debt

[22] "A common view was then that the de facto dual exchange rate might be the final straw to break relations with the Fund" (Powell, 2003).
[23] The program also included additional resources from the World Bank, the IADB and private sector international banks.
[24] One possibly important difference was that the IMF now seemed to have been supportive of the idea of a voluntary restructuring of Argentina's debt. Thus, while the bailout might have been intended to facilitate that debt restructuring, it still entailed some losses for international investors; the IMF did not attempt to provide a full bailout to international investors.

(under the tutelage of its new president Rodriguez Saá – whose government lasted for one week).

In the face of growing criticism of large bailout programs, especially coming from the U.S. administration, the IMF's commitment through most of 2001 to support the Argentine government (and especially the August signing of a new agreement) was an important signal to the markets. Thus, one would expect that if a moral hazard exists in international debt markets that spreads would have decreased following the August announcement and increased following the abandonment of Argentina and its political and economic collapse in December of the same year.

An examination of Figure 6 reveals no such dynamics. If anything, there was a slight increase in other countries' spreads following the August announcement and a possibly more significant, but not uniform, decrease in spreads following the Argentinean political collapse and default in December. Whatever the merits of the argument supporting a moral hazard criticism of the IMF for the periods following the Mexican and East Asian crisis, it is evident that no change in perceptions attributable to a moral hazard effect can be found in the price dynamics of international debt for 2001-2002.

6. Conclusion and Suggestions for Further Research

We argued that a moral hazard created through a bailout guarantee will possibly lead to any of the following: (1) An increase in amounts lent; (2) a

decrease in the price of loans so that it no longer reflects the true (insurance-free) risk borne; (3) a change in the composition of investment away from uninsured investment to insured flows; (4) a change in the composition of international portfolios away from less risky but less profitable investment opportunities to more risky but more profitable if outcomes are positive; and (5) a shift in the international allocation of resources to countries that are deemed more systemic and therefore more likely to be bailed out.

We employed various statistical methodologies and observed various data sources and have been unable to find much evidence consistent with these effects of IMF policies between 1994 and 2002. We re-investigate the evidence surrounding the event that is used by Dell'Ariccia et al. (2002) to provide support for a moral hazard hypothesis and argue that their finding is consistent with a different hypothesis, which we consider much more likely, and present evidence to that effect.

Naturally, a failure to reject the null of no-change-in moral-hazard is not the same as arguing that there is no moral hazard created by IMF lending practices. Three possibilities arise: (1) our statistical tests are not powerful enough; (2) there is no quantitatively significant (observable) moral hazard effect; or (3) the perceptions of the likelihood of bailouts did not change following the Mexican, and other large bailouts or their absence in other instances, and had been relatively constant over the last decade. The last possibility does not imply that the moral hazard effect is insignificant but rather that it is relatively unchanging and had been around for longer than our sample period (1994-2002).

We lastly consider some possible extensions to the empirical work applied here. Extending the analysis to the pre-1994 era and investigating whether one can observe any change in international flows prior to that date might provide us with information related to the third possibility. The paucity of pre-1994 data on spreads prevented us from undertaking this exercise but constructing datasets that will be suitable for such an analysis seems possible.

A shortcoming of our event study approach is that the event choices are ad-hoc. In our case, these are based on 'popular' perceptions of which IMF bailouts actually surprised international markets and therefore affected measured spreads. An alternative strategy might be based on identifying these surprise-events by employing results from the literature that looks at the likelihoods of participation in IMF programs (e.g., Conway, 1994; Hutchison, 2003; Hutchison and Noy, forthcoming; and Knight and Santaella, 1997). Cases where the likelihood to participate are below a certain threshold but a program was actually observed can then be identified as surprises. While this algorithm does not contain an ad-hoc component it assumes a satisfactory predictive capacity for the empirical participation model. Yet, the explanatory power of these models is generally weak and these do not capture the relative, and possibly unquantifiable, importance of various programs in changing market perceptions.

Lastly, data on disaggregated capital flows by their type and most importantly by their country of origin might provide us with more information and might be enable us to support (or refute) our findings. Aizenman and Noy (2003) discuss the possible uses of such a bilateral capital flows data set in more detail.

References

Aizenman and Noy (2003). "Endogenous financial openness: efficiency and political economy considerations." Mimeo, UCSC.

Atkeson, Andrew (1991). "International Lending with Moral Hazard and Risk of Repudiation." *Econometrica* 59(4), 1069-1089.

Aylward, Lynn, and Rupert Thorne (1998). "Countries' Repayment Performance vis-à-vis the IMF." *IMF Staff* Papers, 45(4), 595-618.

Blundell, Richard and Monica Costa Días (2000). "Evaluation Methods for Non Experimental Data." *Fiscal Studies*, 21(4), 427-468.

Bordo, Michael and Anna J. Schwartz (2000). "Measuring Real Economic Effects of Bailouts: Historical Perspectives on How Countries in Financial Distress Have Fared With and Without Bailouts." NBER working paper 7701, May.

Calomiris, Charles, W. (2000). When Will Economics Guide IMF And World Bank Reforms?" *Cato Journal*, 20(1), 85-103.

Campbell, John Y., Andrew W. Lo and A. Craig MacKinlay (1997). *The Econometrics of Financial Markets.* Princeton, NJ, Princeton UP,.

Cline, William R. and Kevin J. S. Barnes (1997). "Spreads and Risk in Emerging Markets Lending." *IFI Research Paper* 97-1.

Conway, P. (1994). "IMF Lending Programs: Participation and Impact." *Journal of Development Economics* 45, 365-391.

Corrado, Charles J. (1989). "A Nonparametric Test for Abnormal Security-Price Performance in Event Studies." *Journal of Financial Economics* 23, 385-95.

Corsetti, Giancarlo, Guimarães, Bernardo and Nouriel Roubini (2003). "International Lending of Last Resort and Moral hazard: A model of IMF's Catalytic Finance." Mimeo, New York University, March.

Dekle, Robert and Kenneth Kletzer (2001). "Domestic Bank Regulation and Financial Crises: Theory and Empirical Evidence from East Asia." IMF working paper WP/01/63, May.

Dell'Ariccia, Giovanni, Isabel Schnabel and Jeromin Zettelmeyer (2002). "Moral Hazard and International Crisis Lending: A Test." IMF Working Paper WP/02/181, October.

Dicks-Mireaux, L., Mecagni M., Schadler S., (2000). "Evaluating The Effect Of

IMF Lending To Low-Income Countries." *Journal of Development Economics* 61(2), 495-526.

Döbeli, Barbara and Paolo Vanini (2002). "An Analysis of IMF Induced Moral Hazard". Mimeo, Swiss Central Bank.

Dooley, Michael (2000). "An Insurance Model of Crises." *Economic Journal* 110, 1-17.

Dreher, Axel and Roland Vaubel (2001). "Does the IMF Cause Moral Hazard and Political Business Cycles? Evidence from Panel Data." Mimeo, Universität Mannheim.

Dungey, Mardi, Renée Fry, Brenda González-Hermosillo, and Vince Martin (2002). "International Contagion Effects From The Russian Crisis And The LTCM Near-Collapse." IMF Working Paper WP/02/74, April.

Eichengreen, Barry (2000). *Can the Moral Hazard Caused by IMF Bailouts be Reduced?* Geneva Reports on the World Economy.

Eichengreen, Barry and Ashoka Mody (2002). "What Explains Changing Spreads on Emerging-market Debt? Fundamentals or market sentiments?" In: Edwards, Sebastian (ed.) *Capital Flows and the Emerging Economies: Theory, Evidence, and Controversies*, Chicago, University of Chicago Press.

Ghosal, Sayantan and Marcus Miller (2002). "Co-Ordination Failure, Moral Hazard And Sovereign Bankruptcy Procedures. Mimeo, University of Warwick, November.

Greene, William H. (2000). *Econometric Analysis.* New Jersey, Prentice Hall.

Heckman, J. (1979). "Sample Selection Bias as a Specification Error." *Econometrica* 47, 153-61.

Hutchison, Michael (2003). "A Cure Worse Than The Disease? Currency Crises And The Output Costs Of IMF-Supported Stabilization Programs." In: Dooley, M. P., Frankel, J. A., (Eds.) *Managing Currency Crises in Emerging Markets*. Chicago, University of Chicago Press.

Hutchison, Michael and Ilan Noy (forthcoming). "Macroeconomic Effects of IMF-Sponsored Programs in Latin America." *Journal of International Money and Finance*.

Jeanne, Olivier (1999). "Sovereign Debt Crises And The Global Financial Architecture." Mimeo, IMF.

Kamin, Steven B. (2002). "Identifying The Role Of Moral Hazard In

International Financial Markets." International Finance Discussion Papers 736, Board of Governors of the Federal Reserve System, September.

Kamin, Steven B. and Karsten von Kleist (1999). "The Evolution and Determinants of Emerging Market Credit Spreads in the 1990s." BIS Working Paper 68.

Kharas, Homi, Brian Pinto and Sergei Ulatov (2001). "An Analysis of Russia's 1998 meltdown: Fundamentals and market Signals." *Brookings Papers On Economic Activity*, 1.

Kho, Bong-Chan and Rene M. Stulz (1999). "Banks, the IMF, and the Asian Crisis." NBER working paper 7361.

Knight, Malcom and Julio A. Santaella (1997). "Economic Determinants of IMF Financial Arrangments." *Journal of Development Economics* 54, 405-436.

Lane, Timothy and Steven Phillips (2000) "Does IMF Financing Result in Moral Hazard." IMF Working Paper WP/00/168.

Larraín, Guillermo, Helmut Reisen and Julia von Maltzan (1997). "Emerging Market Risk and Sovereign Credit Ratings." *OECD Technical Papers 124.*

Lerrick, Adam and Allan H. Meltzer (2003). "Blueprint For An International Lender Of Last Resort." *Journal of Monetary Economics* 50, 289–303.

MacKinlay, A. Craig (1997). "Event Studies in Economics and Finance." *Journal of Economic Literature* 35, 13-39.

Mauro, Paolo, Nathan Sussman and Yishay Yafeh (2002). "Emerging Market Spreads: Then and Now." *Quarterly Journal of Economics*, May, 695-733.

McKinnon, Ronald and Huw Pill (1998). "The Overborrowing Syndrome: Are East Asian Economies Different?" In: Reuven Glick (ed.) *Managing Capital Flows and Exchange Rates: Perspectives from the Pacific Basin*. Cambridge, United Kingdom, Cambridge UP.

Meltzer, Allan H. [chairman] (2002). "Report Of The International Financial Institution Advisory Commission." March.

Min, Hong G. (1998) "Determinants of Emerging Market Bond Spread: Do Economic Fundamentals Matter?" Mimeo, World Bank.

Morse, D. (1984). "An Econometric Analysis of the Choice of Daily Versus Monthly Returns in Tests of Information Content." *Journal of Accounting Research* 22, 605-623.

Mussa, Michael (1999). "Reforming the International Financial Architecture:

Limiting Moral Hazard and Containing Real Hazard." In: David Gruen and Luke Gower (eds.) *Capital Flows and the International Financial System.* Economic Group, Reserve Bank of Australia.

Niskanen, William A. (1999). "Reshaping The Global Financial Architecture: Is There A Role For The IMF?" *The Cato Journal* 18(3).

Pastor, Manuel and Carol Wise (2001). "From Poster Child to Basket Case." *Foreign Affairs*, November-December.

Powell, Andrew (2003). "Argentina's Avoidable Crisis: Bad Luck, Bad Economics, Bad Politics, And Bad Advice." In: Collins, S. and D. Rodrick (eds.) *Brookings Trade Forum 2002*. Brookings Institution Press, 1-38.

Powell, Andrew and Leandro Arozamena (2003). "Liquidity Protection versus Moral hazard: the role of the IMF." Paper presented at the SCCIE conference on Financial Crises in Latin America, April.

Reinhart, Carmen (2002). "Default, Currency Crises and Sovereign Credit Ratings." NBER working paper 8738.

Rogoff, Kenneth (1999). "International Institutions for Reducing Global Financial Instability." NBER working paper 7265.

Rogoff, Kenneth (2002). "Economic Focus: Managing the world economy." *The Economist*, 8/3/2002, 62-64.

Schadler, Susan et al. (1995). "IMF Conditionality: Experiences Under Stand-By and Extended Arrangements. Part I: Key Issues and Findings." *Occasional Paper* 128., Washington, D.C., IMF Press.

Sutton, Gregory D. (1998). "Spread Overreaction in International Bond Markets." BIS working paper 55.

Appendices

A - Data

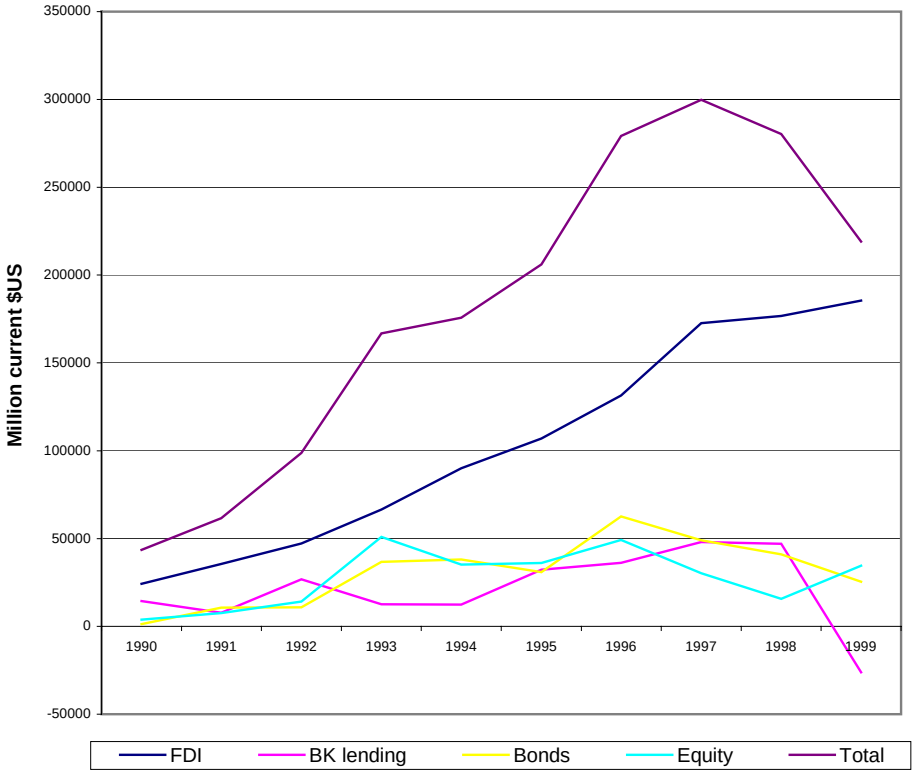
Variable	Code	Source
Liquidity and solvency variables:		
• Debt to GDP ratio	DBTGDP	IFS 85A.ZF
• Net foreign assets	NETFAS	IFS 11.ZF, 16C.ZF
• Reserves to GDP ratio	FXRGDP	IFS 1D.DZF
• Current account flows relative to exports	CAEXP	IFS 78ALD.ZF
Macroeconomic variables:		
• Inflation rate	CPI	IFS 64.XZF
• High inflation dummy (CPI>30)	CPID	
• Fiscal deficit to GDP ratio	GOVGDP	IFS 80.ZF
• Export growth	DLEX	IFS 70.DZF
• Credit ratings (S & P's Credit Ratings)	RESRTNG	see appendix B
External variables:		
• US Federal Funds rate	USRATE	IFS 60.BZF
• Developing countries exports' price index	EXPP	IFS 20174.DZF

B - Standard & Poor's Sovereign Credit Ratings

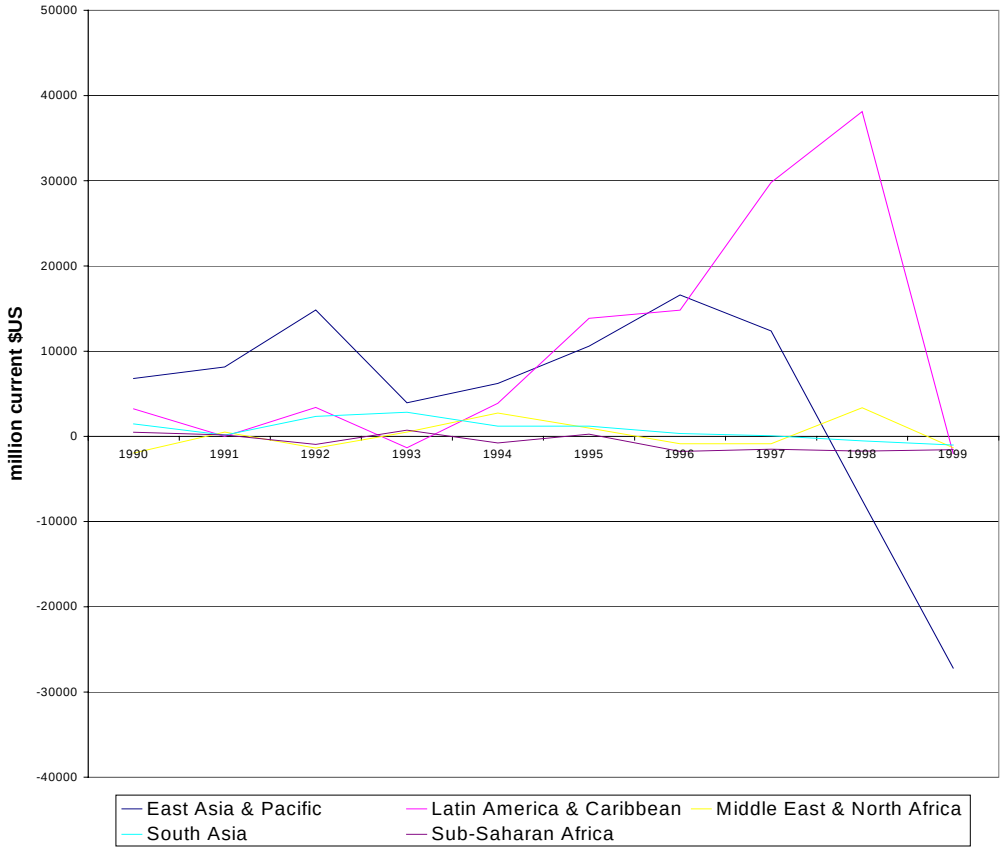
S&P's sovereign credit rating	Codes used
AAA	21
AA+	20
AA	19
AA-	18
A+	17
A	16
A-	15
BBB+	14
BBB	13
BBB-	12
BB+	11
BB	10
BB-	9
B+	8
B	7
B-	6
CCC+	5
CCC	4
CCC-	3
CC	2
D	1

S&P's short-term foreign currency credit ratings are taken from:
http://www.standardandpoors.com/RatingsActions/RatingsLists/Sovereigns/index.html

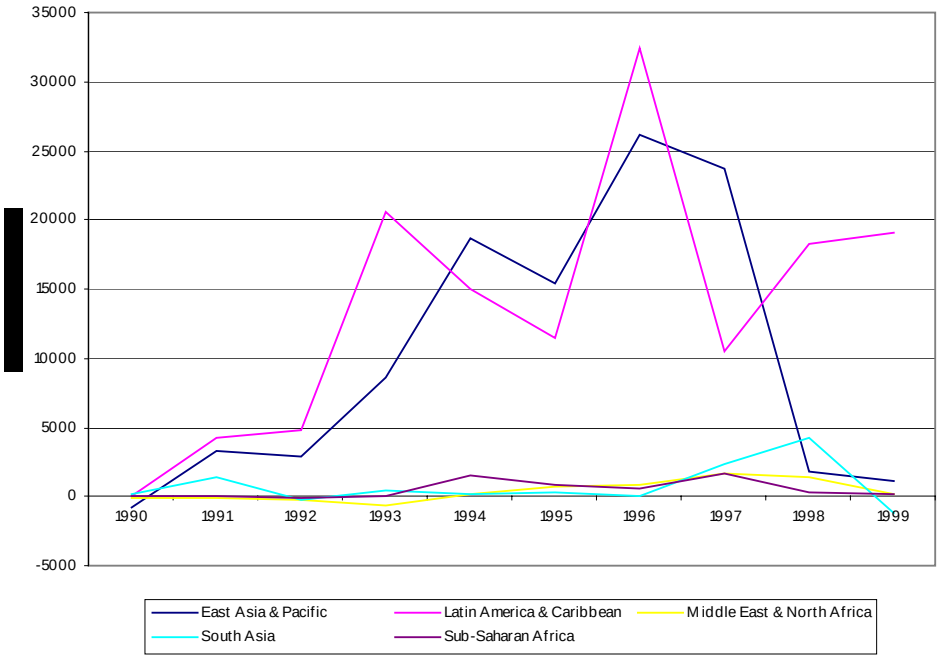
2.1: Capital Flows for Lower & Middle Income Countries - by Types



2.2: Bank Lending by Region



2.3: Bonds by Region



2.4 - Monthly Country Spreads

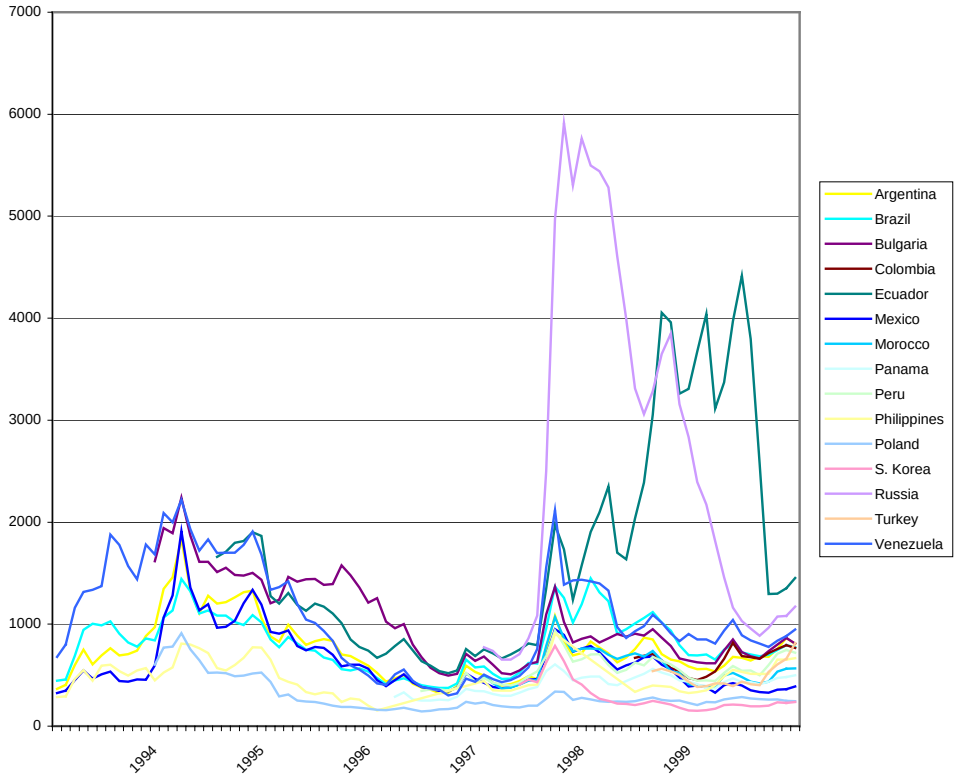


Figure 2.5 - EMBI+ Indices

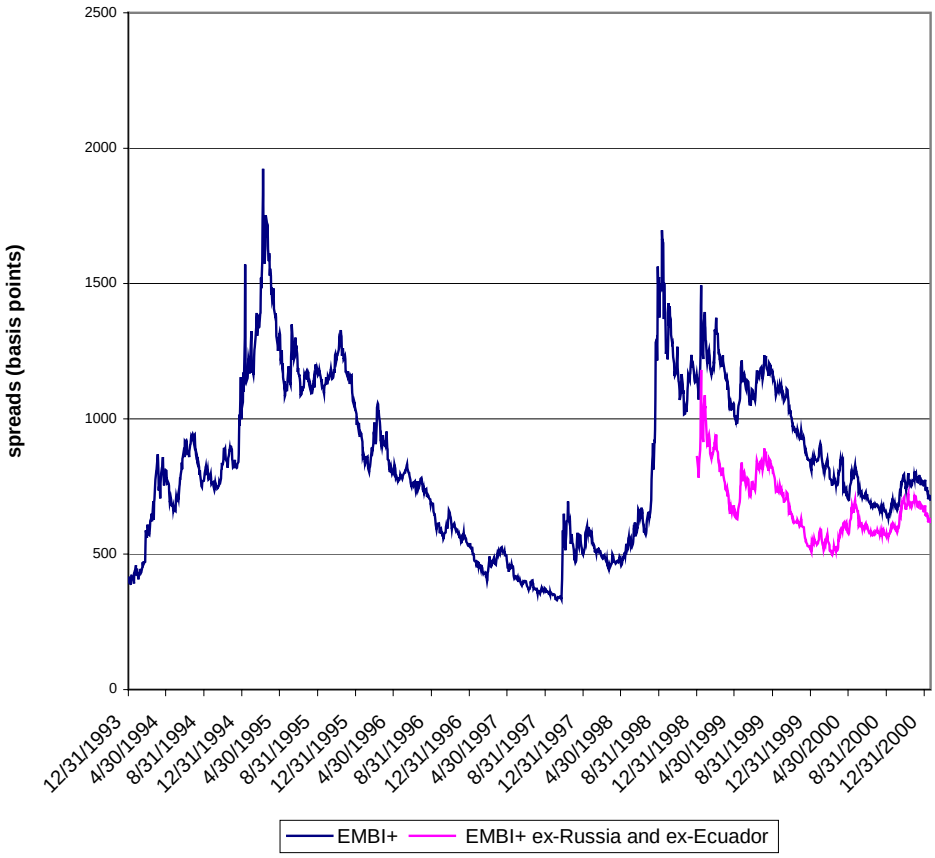


Figure 2.6 – Monthly Country Spreads 2001-2002

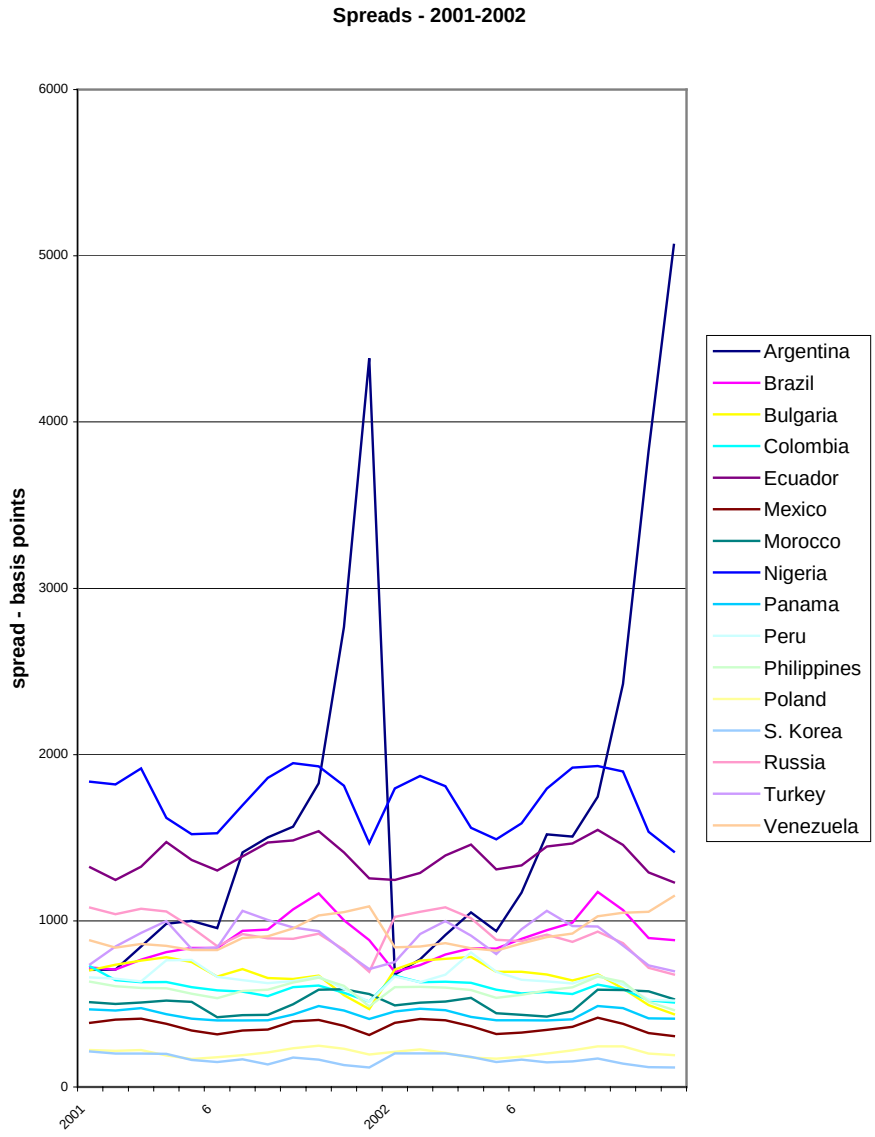


Table 1 - Estimation-Window Sample

	Perfect Foresight	Lagged Variables
	269.24	114.83
CAEXP	(7.47)	(2.77)
	-3453.00	-450.55
DBTGDP	(-3.72)	(-0.33)
	386.06	475.92
FXRGDP	(1.76)	(1.85)
	0.14	-0.20
NETFAS	(0.29)	(-0.39)
	-0.08	-0.03
CPI	(-0.69)	(-0.24)
	425.26	546.64
CPID	(5.84)	(6.32)
	0.08	0.26
DLEX	(0.19)	(0.56)
	1674.57	199.97
GOVGDP	(3.30)	(0.36)
	-298.99	-182.50
RESRTNG	(-9.74)	(-5.95)
	-26.45	-17.95
EXPP	(-4.58)	(-2.77)
	-53.92	-46.40
USRATE	(-1.05)	(-0.78)

Table 2 - Abnormal Spreads – Averages for Post Event Data

Perfect Foresight Normal Model - OLS

	Mean	STD	Min	Max	N
Following Moral Hazard inducing events	-107.2	1505.1	-2708.2	1144.8	108
1 month following event	-132.4	1203.9	-2708.2	583.3	27
2 months following event	-160.0	1209.7	-2698.9	752.8	27
3 months following event	-107.0	1243.0	-2558.3	1144.8	27
4 months following event	-29.7	1275.2	-1883.0	1107.0	27

Table 3 - Abnormal Spreads – Averages for Post Event Data

Perfect Foresight Model - Excluding Same-Country Crisis Observations

	Mean	STD	Min	Max	N
Following Moral Hazard inducing events	-78.8	702.2	-2907.5	1129.7	100
1 month following event	-99.7	726.8	-2907.5	793.6	25
2 months following event	-113.4	740.7	-2865.6	795.4	25
3 months following event	-76.6	731.4	-2720.5	1129.7	25
4 months following event	-25.6	646.2	-2053.4	1091.2	25

Table 4 - Abnormal Spreads – Averages for Post Event Data

Model with Lagged Variables - Excluding Same-Country Observations

	Mean	STD	Min	Max	N
Following Moral Hazard inducing events	-85.2	858.6	-3694.0	1465.5	100
1 month following event	-90.7	940.3	-3694.0	1465.5	25
2 months following event	-118.0	904.9	-3665.1	974.2	25
3 months following event	-107.0	862.2	-3474.4	885.4	25
4 months following event	-24.9	767.7	-2816.8	1327.0	25

Table 5 - Abnormal Spreads – Averages for Post Russian Default Data

	Mean	STD	Min	Max	N
Perfect Foresight Model					
Month Following Russian Default	-368.5	314.8	-1095.7	53.9	10
2-4 months following Russian Default	57.6	301.0	-613.8	585.2	27
Model with Lagged Variables					
Month Following Russian Default	-337.5	467.3	-1108.7	695.1	10
2-4 months following Russian Default	10.8	467.9	-880.0	857.6	27